

AMENDMENTS TO THE CLAIMS

As of the Office Action dated June 29, 2005, Claims 1-20 were pending. In this response, Claims 1 and 16 are amended. As of this response, Claims 1-20 are pending.

1. (Amended) A method for reconstructing complex wave attributes described by an object function O from limited view measurements u of a measurement surface \mathbf{r} with associated wavevector \mathbf{K} , said method comprising the steps of:

processing said limited view measurements u to obtain Fourier transformed measurements \tilde{u} ;

determining a Fourier transformed object function \tilde{O} of said object function O ;

determining an analytic relationship between said Fourier transformed object function \tilde{O} and said Fourier transformed measurements \tilde{u} ;

analytically extending said Fourier transform \tilde{O} by specifying that $\tilde{O}(\mathbf{K}) = \tilde{O}(-\mathbf{K})$,

thereby obtaining an analytically extended Fourier transform of \tilde{O} ; ~~and,~~

reconstructing said complex wave attributes by inverting said analytically extended

Fourier transform of \tilde{O} ; ~~and,~~

presenting said reconstructed complex wave attributes as an image.

2. (Previously Presented) The method of Claim 1 wherein said complex wave attributes are wave speed and attenuation.

3. (Previously Presented) The method of Claim 1 wherein said complex wave attributes are dielectric and electrical conductivity.

4. (Previously Presented) The method of Claim 1 wherein said complex wave attributes are acoustic wave speed density and compressibility.

5. (Previously Presented) The method of Claim 1 wherein said object function is one-dimensional.
6. (Previously Presented) The method of Claim 1 wherein said object function is two-dimensional.
7. (Previously Presented) The method of Claim 1 wherein said object function is three-dimensional.
8. (Previously Presented) The method of Claim 1 wherein said measurement surface **r** comprises a ring.
9. (Previously Presented) The method of Claim 1 wherein said measurement surface **r** comprises a sphere.
10. (Previously Presented) The method of Claim 1 wherein said measurement surface **r** comprises a cylinder.
11. (Previously Presented) The method of Claim 1 wherein said measurement surface **r** comprises a plurality of parallel lines.
12. (Previously Presented) The method of Claim 1 wherein said measurement surface **r** comprises a plurality of perpendicular lines.
13. (Previously Presented) The method of Claim 1 wherein said measurement surface **r** comprises a line and a curved surface.

14. (Previously Presented) The method of Claim 1 wherein said limited view measurements are time domain measurements.
15. (Previously Presented) The method of Claim 1 wherein said limited view measurements are frequency domain measurements.
16. (Amended) A method for reconstructing complex wave attributes described by an object function O from limited view measurements u of an object with associated wavevector \mathbf{K} , said method comprising the steps of:
- processing said measurements u to obtain Fourier transformed measurements \tilde{u} ;
 - determining a midpoint of said object;
 - creating shifted Fourier transformed measurements \tilde{u}_r by shifting said Fourier transformed measurements \tilde{u} so that said midpoint is located at the origin;
 - determining an analytic relationship between said object function O and said shifted Fourier transformed measurements \tilde{u}_r ;
 - determining the Fourier transform \tilde{O} of said object function O from said Fourier transformed measurements \tilde{u}_r using said analytic relationship;
 - analytically extending said Fourier transform \tilde{O} by specifying that $\tilde{O}(\mathbf{K}) = \tilde{O}(-\mathbf{K})$, thereby obtaining an analytically extended Fourier transform of \tilde{O} ;
 - determining shifted complex wave attributes by inverting said analytically extended Fourier transform of \tilde{O} ; and,
 - reconstructing said complex wave attributes by shifting said shifted complex wave attributes back to said midpoint; and,
 - presenting said reconstructed complex wave attributes as an image.

17. (Previously Presented) The method of Claim 16 wherein said step of determining a midpoint comprises the steps of:
- determining the complex contrast of said object;
 - determining the magnitude of said complex contrast; and,
 - choosing said midpoint to be the center location of said complex contrast.
18. (Previously Presented) The method of Claim 16 wherein said step of determining a midpoint comprises the steps of:
- determining the complex contrast of said object;
 - determining the magnitude of said complex contrast; and,
 - choosing said midpoint to be the mid-depth of said complex contrast.
19. (Previously Presented) The method of Claim 16 wherein said midpoint is a spatial component and said step of determining a midpoint comprises choosing said midpoint to be the depth achieved at the maximum measured travel time.
20. (Previously Presented) The method of Claim 16 wherein said midpoint is a temporal component and said step of determining a midpoint comprises choosing said midpoint to be the maximum measured travel time.